
Federal Office
of Metrology and
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Landesamt für Digitalisierung,
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# Discussion

## Pilot Projects

- What can be done to make the best out of the pilot projects?
  - How should the observations be simulated?
  - Can we mix real and simulated observations? Simulated observations should be as realistic as possible. Which information should be provided with the pilot projects?
  - Requirements for ESA orbit

## Orbit combination

- Is the orbit combination at the normal equation level the most promising approach?
  - Are analysis centres willing to provide SINEX files for orbit combination?
  - What changes are necessary to the analysis software to enable the simultaneous estimation of orbital parameters and a common set of geodetic parameters from GNSS, VLBI, SLR and DORIS?
- Requirements for orbit combination at normal equation level
  - SINEX files
  - time series with positions and partials
  - tools and tests
  - time tagging
  - UTC vs. GPS time
  - ...

## Readiness of IAG Services, etc.

- Are the existing IERS conventions sufficient for Genesis data analysis, or are updates necessary?
- What is the status of the different IAG services in the preparation of the Genesis mission?
  - What processing chains at individual analysis centres have to be modified, what information exchange is required between the Services? What are current limitations? Will there be daily or weekly sessions by the techniques?
- Which formats need to be adapted or newly developed?
  - e.g., for exchange of non-gravitational accelerations
- What comparison campaigns between analysis centres, software packages, techniques have to be envisaged and developed?

## Observing strategies and calibration

- What methodologies should be used or developed to allow for in-orbit verification of calibrations?
- What coordinated multi-technique observation strategies (e.g. simultaneous VLBI and SLR observations) are feasible and beneficial for the mission?
- How should the different technique-dependent systematic effects be parametrised in the analysis of Genesis data?
  - e.g. antenna phase centre variations, antenna/reflector offsets, VLBI transmitter delays, SLR centre-of-mass offsets, DORIS beacon offsets and GNSS inter-frequency biases

## Six Levels of Rigorousness (Backup Slide)

1. Orbit combination at product level as weighted average, then used as fixed by the different techniques for data analysis.
2. One 4-technique solution including Genesis at observation level provides normal equations which are used to tie the solutions (not including Genesis) from the different techniques.
3. Combination of multi-technique solutions after pre-eliminating Genesis orbit parameters from the normal equations.
4. Stacking of orbit initial state vectors of Genesis, enforcing the use of the identical force model by all analysis centers.
5. Provision of kinematic satellite positions in the normal equation and transformation to orbit parameters by the combination center.
6. Combination of orbit parameters at the normal equation level.